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Contents for Week of March 2, 1936. Vol. XV. No. 2.

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Photograph by Pacific and Atlantic Photos, Inc.

SUNTIME WAS ONCE THE WORLD'S STAND-BY

Before the establishment of Standard time zones, each place looked to its own sundial. This many-faced sundial, in Baltimore's Druid Hill Park, Maryland, tells the suntime in a number of the world's principal cities (see Bulletin No. 2).

HOW TEACHERS MAY OBTAIN THE BULLETINS

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Texas Remembers the Alamo

ON MARCH 6, the Lone Star State will celebrate the centenary of the most famous event in Texas history, the siege of the Alamo. Not only will this tragic battle be commemorated in San Antonio, where thousands annually visit the birthplace of Texan liberty, and in Austin, the State capital, where a monument recalls the Alamo's defenders, but a likeness of the Alamo will be sent throughout the United States on a purple three-cent stamp.

The building most Americans know as the Alamo is really only a part of the original Fort Alamo, in which a small band of their countrymen fought so fiercely for Texas freedom. Now a state-owned museum in the heart of San Antonio's business district, this restored, Spanish-type edifice, with ornate carvings on doorways and pillars, was once the chapel of a large mission, covering several acres.

The Alamo—Originally a Spanish Mission

The old stone building, with its flat façade scalloped to a peak above the entrance, is peaceful now, undisturbed within its ivy-covered walls (see illustration, next page). Instead of doomed and valiant men, it shelters old documents, weapons, relics of Spanish rule, and mementoes of other governments which in succession flew six flags over Texas.

In the eighteenth century Spanish padres built a number of Franciscan missions in Texas to Christianize and educate Indians. Among those established in and around the present city of San Antonio was that of San Antonio de Valero, begun in 1718, although its famous chapel was not added until 1744. The mission grew until its adobe walls, eight feet high and thirty-three inches thick, protected a hospital, barracks, and other buildings, as well as the chapel.

At the height of its power the mission was full of picturesque activity. Solemn brown-frocked padres moved among their gaily-blanketed, swarthy pupils, baptizing and blessing them, and instructing them in handicrafts and husbandry.

After 1793, ringing of the sweet-toned mission bells was often interrupted by musket shots. Padres and settlers of the surrounding region used the fortified mission as a refuge from hostile tribes. By 1805 the one-time mission San Antonio de Valero was known as Fort Alamo, and echoes of the monks' gentle tones died under drums and songs of Mexican troops quartered there.

Inventor of the Bowie Knife

At this time Texas was still part of Mexico, but American settlers came in increasing numbers over its rolling plains. These independent, self-assertive frontiersmen, finding Mexican justice too slow, revolted against Mexico and sought to make Texas a republic. One of their first acts was to entrench within the Alamo.

On February 23, 1836, San Antonio's streets rang with bugle calls, rattling of swords, and rumbling of cannon being hauled into position, as over 2,000 Mexicans under General Santa Anna swarmed to the assault. Inside the Alamo, with hardly two dozen cannon to defend them, waited less than two hundred Americans. Among them were the youthful patriot, Colonel William B. Travis, in command of the garrison; the picturesque Indian fighter, Davy Crockett, in his buckskins and with his favorite rifle "Betsy"; and Colonel James Bowie, the romantic swashbuckler, credited with designing the Bowie knife popular with frontiersmen.

On the day after the bombardment began, Travis sent out a frantic appeal for help. All the answer he received was 32 volunteers from Gonzales, who, on

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FIESTA TIME IN TEXAS

Remembering the Alamo, Texas is arranging for the summer of 1936 a centennial celebration of her independence from Mexico. But the Mexican influence lingers on in this old garden in San Antonio. The girl wears a white lace *mantilla* on a huge comb, while the boy has a typical *charro* costume—wide sombrero, tight trousers, and a bright *serape* over the shoulder (see Bulletin No. 1).

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Time Marches West

FATHER TIME is taking the spotlight in Chicago. Clocks and watches were due to be set ahead one hour on March 1 in America's second largest city by local law, giving Chicagoans year-round daylight saving time.

The time change was planned in Chicago chiefly for business convenience, so that activities could tie up more closely with the markets of New York. By setting its clocks ahead, Chicago would change from Central time to Eastern time, the same as that which now prevails in seven of the ten largest cities in the country.

But next summer, if Chicago should again set its clocks ahead to conform with New York daylight saving time, it would be two hours ahead of the time followed in nearby parts of Illinois, Indiana, and Wisconsin.

Actual Time Set by Stars

Chicago has a right to change its local time, though actual time does not change. Actual time is governed by the stars, which show how long it takes for the earth to make one complete turn on its axis. Astronomers, watching a star apparently pass a fixed point in the sky overhead as the earth turns, measure the length of a day of 24 hours by noting the time when the same star again passes the same point on the following night. The sun also is used in this way.

America's most accurate time is kept at the U. S. Naval Observatory in Washington, and is broadcast from there to the nation. In an underground vault, several special clocks tick off the seconds, in a partial vacuum so that there is little air resistance to the swinging of their pendulums. Each clear night astronomers, taking photographs through telescopes, determine the exact instant at which tiny hairs in the centers of their telescopes pass directly under certain stars.

For five minutes before the hour, 20 hours out of the 24, time signals are sent out from the Arlington radio station at intervals of one second. These signals, of course, will make Chicago's new time as accurate as the old. The only change is in setting the Chicago clocks ahead.

Once Every Village Had Its Own Time

Years ago, when the fastest travel was on horseback or afoot, every city or village could have its own time—noon in each place was when the sun stood overhead. But, with the coming of railroads and faster communication, this system did not work. The world was divided then into 24 time zones of equal width, each of which represents the distance that the earth turns under the sun in one hour. Clocks in each zone are set by the time in the center of the zone. Many individual places on the earth, however, still use their own local time.

The United States has four time zones—Eastern time, which extends, roughly, from the seaboard to beyond the Allegheny Mountains; Central time, covering the great Mississippi drainage basin; Mountain time, in the high plains and the Rockies; and Pacific time, for the west coast. Though located well within the Central time zone, Chicago now will be one hour ahead of it.

These four time zones have irregular boundaries, based to a large extent on the location of railroad division points, so that all trains in each division may run on the same time with complete safety and convenience. The system of time zones was adopted by the railroads in 1883, but was not legalized until 1919, when Congress gave the Interstate Commerce Commission power to regulate time zones.

The Commission has power only to regulate time for railroads and federal

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March 1, sneaked through the enemy lines into the Alamo. They simply meant 32 more doomed men. A courier, sent out for help on March 3, returned without aid.

Santa Anna had expected quick victory. A well sunk within the walls, and some cattle, corn, and other supplies, however, enabled the besieged to hold out for twelve days. Informed by a spy that supplies and ammunition were failing, Santa Anna decided to take the Alamo by storm. From his headquarters in San Fernando Cathedral on March 6 he issued a command of "No quarter." His soldiers swarmed up scaling ladders and at last cornered the remaining defenders in one of the buildings, where they killed them in a desperate hand-to-hand struggle.

When the smoke of battle cleared, although bodies of over five hundred Mexicans were piled high around the building, not a single man who defended the Alamo was alive. The only survivors were a few women and children.

The sacrifice of this little band of Texans spurred their fellows on. With the slogan "Remember the Alamo," Sam Houston's troops fought so furiously in the battle of San Jacinto a month later that they captured Santa Anna. To secure his release he signed the treaty that recognized the independence of Texas.

Note: Teachers preparing work units about Texas in connection with the centennial celebration should consult the following: "So Big Texas," *National Geographic Magazine*, June, 1928; "The Origin of American State Names," August, 1920; "Along Our Side of the Mexican Border," July, 1920; and "Texas, Our Largest State," December, 1913.

Bulletin No. 1, March 2, 1936.

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A SHRINE TO VALOR IN SAN ANTONIO'S BUSY HEART

The Alamo, old mission-fortress, contains many mementoes of its heroic defense by a small band of Texans fighting for freedom from Mexico in 1836. A garden and the ruins of an ancient cloister attract natives as well as visitors to this most historic of all Texas spots.

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Kensington, Where London Honors Watt

TO LONDON, as a youth, came a Scottish engineer learning to make mathematical instruments, but London paid no attention to him. The engineer finally took his patented plan for manufacturing an improved steam engine to Birmingham, and soon London had to take notice. His name, James Watt, was added to the list of Fellows of the London Royal Society.

It is the bicentenary of Watt's birth that London is celebrating now with a special exhibit in Kensington, cultural and scientific center of England's capital.

The Science Museum, between Queens Gate and Exhibition Road in South Kensington, has arranged a display of portraits of Watt and Boulton, his partner in manufacture; letters describing the inventor's difficulties; drawings of steam engine designs; the garret workshop from Heathfield where Watt experimented; and early models of Watt engines, showing the separate condenser, which was one of Watt's momentous additions to the steam engine principle known for centuries.

Southwest of London's Geographical Center

Within virtually a stone's throw of each other in the museum zone of Kensington are the Science Museum, the Natural History Museum, the huge Victoria and Albert Museum with its splendid collection of industrial art exhibits, the India Museum, the Royal Geographical Society with its statue of explorer Shackleton, the Royal College of Art, the University of London offices, the Royal College of Music, the Imperial War Museum, and other equally noted institutions. Royal Albert Hall, with its huge glass dome, has been the scene of thousands of concerts and meetings.

Small wonder that, to the London visitor, Kensington means museums. Lured by such attractions as the Watt Bicentenary exhibit and the American Wright brothers' original airplane in the Science Museum, or the various types of furniture, textiles, and metalwork in the Victoria and Albert Museum, he finds his way here sooner or later.

Kensington is fitted into London's jigsaw puzzle of 28 boroughs between Paddington, Hammersmith, and Fulham, with Chelsea separating it on the south from the Thames. This southwestern borough, only a short distance from busy Hyde Park corner, is a residential district favored not only by museum exhibits, but by almost 200,000 present-day Londoners and many distinguished persons of the past.

Where Thackeray Wrote and Poe Went to School

Kensington Road, the main artery, changes its name with its nature to become a commercial district for a few blocks. Most of the streets of Kensington, however, are lined with dignified homes, some of them quaint survivals of early London. Seldom more than a block or two long, they are tangled in knots with related names: Queens Gate, Queens Gate Terrace, Queens Gate Place, Queens Gate Gardens. The mere names reveal how they preserve, not far from the stony heart of metropolitan London, a pleasant suburban atmosphere with a quaint aroma of royalty.

Heading the list of Kensington's distinguished homes is Kensington Palace, a relic of the district's former imperial glory. William III, moving the court from central London to this wooded spot for relief from his attacks of asthma, bought the fine old manor house and had it remodeled by Sir Christopher Wren. Four English sovereigns died in this severely plain brick structure. Here, too, were born

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activities, and Chicago or any other city or State may have its own time, disagreeing with official federal time. Railroad time in Chicago, however, may not be changed without the Commission's permission. Most of Michigan, for three years, has been using Eastern time without the Commission's approval.

Time on the earth is reckoned from the Greenwich meridian, an imaginary line running north and south through the observatory at Greenwich, England. West of the meridian, each time zone is an hour earlier, and east of it, an hour later.

When it is noon in Greenwich, it is 7 o'clock in the morning in New York, five zones west of Greenwich; 6 o'clock in St. Louis; 5 o'clock in Denver; and 4 o'clock in San Francisco. Likewise at noon in Greenwich it is 1 o'clock p. m. in Berlin, 2 o'clock in Moscow, 5 o'clock in Bombay, and so on.

Note: Pictures and references about observatories, time-telling devices, and Chicago will be found in the following: "Northern California at work," *National Geographic Magazine*, March, 1936; "The New World Map," December, 1935; "Penn's Land of Modern Miracles," July, 1935; "Southern California at Work," November, 1934; "Washington Through the Years," November, 1931; "Illinois, Crossroads of the Continent," May, 1931; "A Maryland Pilgrimage," February, 1927; "London from a Bus Top," May, 1926; "How the U. S. Grew," May, 1933; "Chicago Today and Tomorrow," January, 1919.

Bulletin No. 2, March 2, 1936.

© *Chicago Aerial Survey Company*

CHICAGO ALTERS ITS RIVER AND ITS TIME

The Chicago River was forced into a straight channel to simplify the railway approaches to the South Side. Then came plans for a change in time, making Chicago an "island" of Eastern Standard time in the Central time zone.

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Musk Oxen, Vanishing Cattle of the Arctic

COLLEGIATE styles from the farthest north college, the University of Alaska, make use of a new source of warmth—musk ox wool. Similar ventures may stimulate the commercial breeding of this remarkable animal, which has been threatened with extermination by Eskimos, Indians, explorers, and hunters.

Beyond the tree limit, on bleak treeless tundras deserted by man and most animals, lives the musk ox—one animal that thrives in blizzards.

Over the frozen prairies of the Barren Grounds, where no Indians dwell, and across vast expanses too cold for Eskimos, the musk ox plods through the darkness and whispering silence of the Arctic night, cropping frozen grass that sticks up through thin snow. Pausing occasionally to rub frost from its eyes, grazing contentedly as a cow in a sunny pasture, the musk ox wanders from the Barren Grounds to Cape Morris Jesup, where the northernmost point of land meets the glittering ice of the Polar Sea. Under the musk ox's shaggy dark coat, protecting him from bitter winds, is a dense coat of wool.

Dark Coat Mistaken for Boulders

In the Arctic summer, when Eskimos desert melting igloos for sealskin tupiks, and Eskimo babies, naked on bearskins, chuckle in sunshine and snatch at butterflies, the musk ox sheds its unnecessary wool, which works out through the permanent long hairs and trails among the golden poppies, arnica, and purple saxifrage.

To those familiar with the protective coloration of Arctic animals—the silvery-white polar bear, the snowy wolves and owls—the dark brown coat of the musk-ox seems to afford no protection. Such is not the case. Grazing, not on snow, but on dark windswept areas, or snowy slopes strewn with large boulders, the musk ox might well be mistaken for another boulder. Hereditary enemies of the musk oxen are the wolves. Although they can do little damage to a herd of adults (see illustration, next page), they follow it to seize the stray calves and sickly old musk oxen driven out of the herd.

Seeing a musk ox walking along a hill crest, heavy head and massive body bulking large against the sky, hunters have thought him a small buffalo. Although his shaggy hide makes him appear larger, the average musk ox is only about the size of Highland cattle. He usually stands about four feet high, and his average weight is 450 pounds dressed. His robe of straggling dark brown hair, stiff as a horse's mane, grows to great lengths—sometimes 20 inches—and trails in the snow. Eskimos call the musk ox Oo-ming-muk, which means "animal-with-skin-like-a-beard." In the roots of this coat grows the protective coat of wool.

Has Traits of Goat, Sheep, and Cow

The hoofs of the musk ox are hairy underneath, which make him sure-footed on the most slippery ice, and they are concave, facilitating swift ascent of rocky slopes and pawing away of snow covering his forage. His yellowish horns sweep out, down, and up to a sharp point, useful in goring wolves and Eskimo dogs.

Like the goat, the musk ox's favorite feeding grounds are rocky hillsides, which, in spite of his short massive legs, he ascends easily. Hunters have marveled at the speed with which startled musk oxen have run away from them, traveling with a choppy, rolling gait and heads carried well forward. Attacked by wolves, a musk ox will jump high in air like a goat and come down heavily on his side to crush the wolf clinging like a leech to his hindquarters.

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Queen Victoria and the Dowager Queen Mary. By order of Queen Victoria the Palace was opened to the public.

Holland House, several blocks away, has been the home of many prominent Englishmen, among them William Penn and Joseph Addison. Leighton House nearby, with its art collection, is a reminder of a colony of artists in the Melbury Road neighborhood where lived Watts, Ellen Terry, and Holman Hunt.

Writers, too, chose Kensington for their home, among them Macaulay and Thackeray, who wrote here "Vanity Fair," "Pendennis," and "Henry Esmond." Little Edgar Allan Poe went to school in a street close by during his brief, bleak London days. Today Kensington contains the studios of many of England's famous artists, sculptors, architects, and writers. It is also an embassy district, including the new United States Embassy, at 13-14 Princes Gate.

But Kensington's chief magnet, for resident and visitor alike, is a beautiful expanse of parkland known as Kensington Gardens (although most of the Gardens are technically within the city of Westminster). Barrie's Peter Pan, as his many admirers know, lived on the island in the Serpentine "where all the birds are born that become little boys and girls."

Note: Kensington references and other photographs can be found in the following: "Great Britain on Parade," *National Geographic Magazine*, August, 1935; "Highlights of London Town (color insert)," May, 1929; and "London from a Bus Top," May, 1926.

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GROWN-UPS ADMIRE THE BOY WHO WOULDN'T GROW UP

Peter Pan's statue, by Sir George Frampton, stands in Kensington Gardens on the west bank of the Long Water, the upper part of the Serpentine lake. Because Barrie described both Peter Pan and Kensington Gardens so delightfully in "The Little White Bird," it is one of the best guidebooks to that park, so popular with London youngsters and nursemaids.

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Modernizing Hyderabad, India's Fabulous Feudal State

JEWEL-STUDDED door handles, Sindbad the Sailor's Valley of Diamonds, and "Midas dungeons" for storing a royal treasure of more than two billion dollars' worth of gold bars and gems—such are the fabled riches of Hyderabad, India's largest native state.

In this "Arabian Nights" region, where magic changes seem probable, new fables are taking form. Slum clearance projects, wasteland reclamation, highway building, and radio stations are making Hyderabad seem not far behind what O. Henry called Baghdad-on-Broadway.

His Exalted Highness, the Nizam of Hyderabad, has ruled the State for a quarter of a century, and on his silver jubilee he is taking steps to insure being remembered. The finest tomb in India as a memorial? That seemed a fruitless goal, with the Taj Mahal already in existence. The greatest modernization project in native India? That would probably have less competition. So his ambition as modernizer is now recorded along with his reputation as perhaps the richest man in the world.

Walled Cities of Mud and Marble

Except for the usual shock of discovering Fifth Avenue conveniences in medieval walled cities of mud and marble, modern travelers do not find the State of Hyderabad very exciting. If they are in search of superlatives and oddities, they may be disappointed in seeing only a peaceful agricultural state about Italy's size. Here life progresses at the tempo of a quiet country town, for more than half the fourteen million people are farmers.

Hyderabad city, the capital, is the largest native capital and the seventh largest city in all India, but most of the people live in the 20,000 villages which dot the country with their green and yellow fringe of cultivated fields.

Through this land of tropical calm the Nizam dashes like a blazing comet, trailed by his retinue of several hundred courtiers, officials, and servants. Whether he chooses to travel in the state coach of gold, or the 1927 model which is his favorite among his fleet of 600 automobiles, or the private train that awaits him constantly with steam up, his passage stirs a ripple of rumor and myth.

Life is hectic in times of flood or drought, when crops fail and famine stalks the land. The Nizam's government must calm the people's panic with farm loans, public works, and lowering of taxes. Even more terrifying is the coming of cholera, now growing rarer. Relief funds for the stricken populace are in little danger of bankrupting the State, for government loans are said to be made at interest rates of 25 per cent!

Source of Coal, Cement, Cotton, and Oilseeds

More rigidly than in medieval feudal Europe, strict social lines divide the people of Hyderabad into farmers, shepherds, traders, weavers, grain-carriers, liquor venders, or house-servants. The country is divided geographically as well as socially, although into fewer sections. The northern part, with its rich black soil, raises wheat and cotton. The south has a sandier surface, and specializes in rice. More than a fifth of the entire country is covered with forests, where satinwood, ebony, teak, and sandalwood grow under government control.

All southern India depends upon Hyderabad for coal and cement. Cotton and oilseeds from the Nizam's dominions are exported in large quantities. Manufacture lags in Hyderabad, although several cotton mills are active. A third of the cloth produced there is still woven on hand looms. Aloof from modern methods of mass production, different sections of the country turn out rare handmade paper, embroideries with gold and silver thread, brocades, and silverware. From the cocoons of a wild native silkworm, a durable silk cloth is made for scarfs, veils, and the native wrap-around dress.

The capital, Hyderabad, is about halfway between Bombay and Madras. The journey from Bombay, made by rail, automobile, or cart, passes through Ajanta, whose famed monasteries were chiseled from the solid rock of a mountainous dome many centuries ago, and through Ellora, whose carved rock temples are similar wonders.

Hyderabad city has many reminders of its historic past. It is still protected by a stone wall with thirteen gates, although many important residences are located in its surrounding suburbs.

Only five miles beyond the western gates stands a huge fortified city in ruins, called by Marco Polo the "marvel of India"—the Fort of Golconda, which was capital of that ancient kingdom. Walls of granite blocks are strengthened with 87 bastions and numerous watch

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Ovibos, the scientific name for musk ox, means "sheep-cow." The musk ox combines many traits belonging to each group. Like sheep, it has wool, a rudimentary tail, hairy muzzle, and similar structure of molar teeth and intestines. Like the cow, it gives milk, has short wide cannon bones, and thrusts out its tongue to hook tufts of grass.

It is more stolid than the reindeer, stupid and gentle. Anyone seeing musk oxen asleep on a river bank or grazing quietly like domestic cattle on young willow shoots understands why they are often referred to as Polar Cattle.

Although classed with walrus and polar bear as the big game of the North, shooting a musk ox is about as difficult and as much sport as shooting a cow in a pasture. Startled, a herd will run, but not far, to form a huddled, trembling mass that stands facing the enemy until shot down.

Herds Now Protected By Law

With their bows and copper-tipped arrows and lances, Eskimo hunters did not seriously deplete the herds. But since explorers gave them rifles, they have slaughtered hundreds upon hundreds without thinking of the future. They feast, cache what they can't eat, save the hides for clothing, the horns for ladles and implements, the teeth for ornaments, and drive away, sometimes leaving behind as many as forty skeletons bleaching on the tundra.

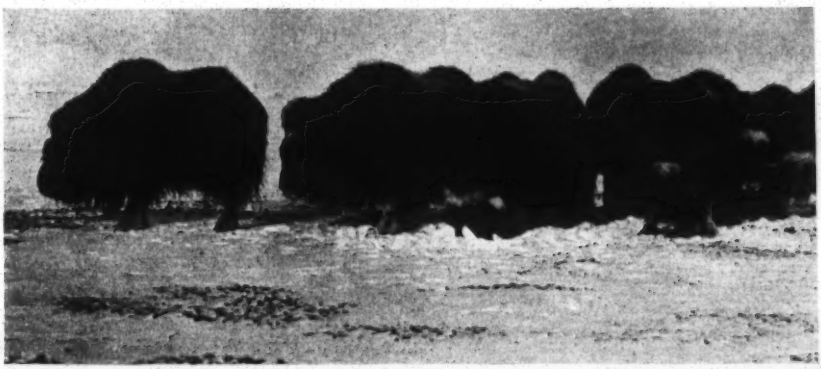
Zoological gardens caused further extermination of musk oxen by offering $5,000 apiece for young ones. Norwegian whalers and sealers wiped out whole herds trying to rope a few live ones. A few more years of reckless hunting and the musk ox would become a myth, a fabulous monster for starving Eskimos and Indians to describe to their starving children.

The twentieth century, however, in its battle for the preservation of natural resources, has taken steps to save from extinction this valuable animal. Various countries have passed laws protecting it. Some require licenses to hunt it, and a few are importing and breeding herds, and setting aside sanctuaries for them.

Note: See also "Canada from the Air," *National Geographic Magazine,* October, 1926; "The 'Bowdoin' in North Greenland," June, 1925; "A Mind's-Eye Map of America," June, 1920; and "Peary As a Leader," April, 1920.

See also "Wild Animals of North America" (revised edition), published by the National Geographic Society and sent postpaid in the U. S. and to its possessions for $2.00. A pamphlet describing this and other publications of The Society will be sent upon request.

Bulletin No. 4, March 2, 1936.



Photograph by Donald B. MacMillan

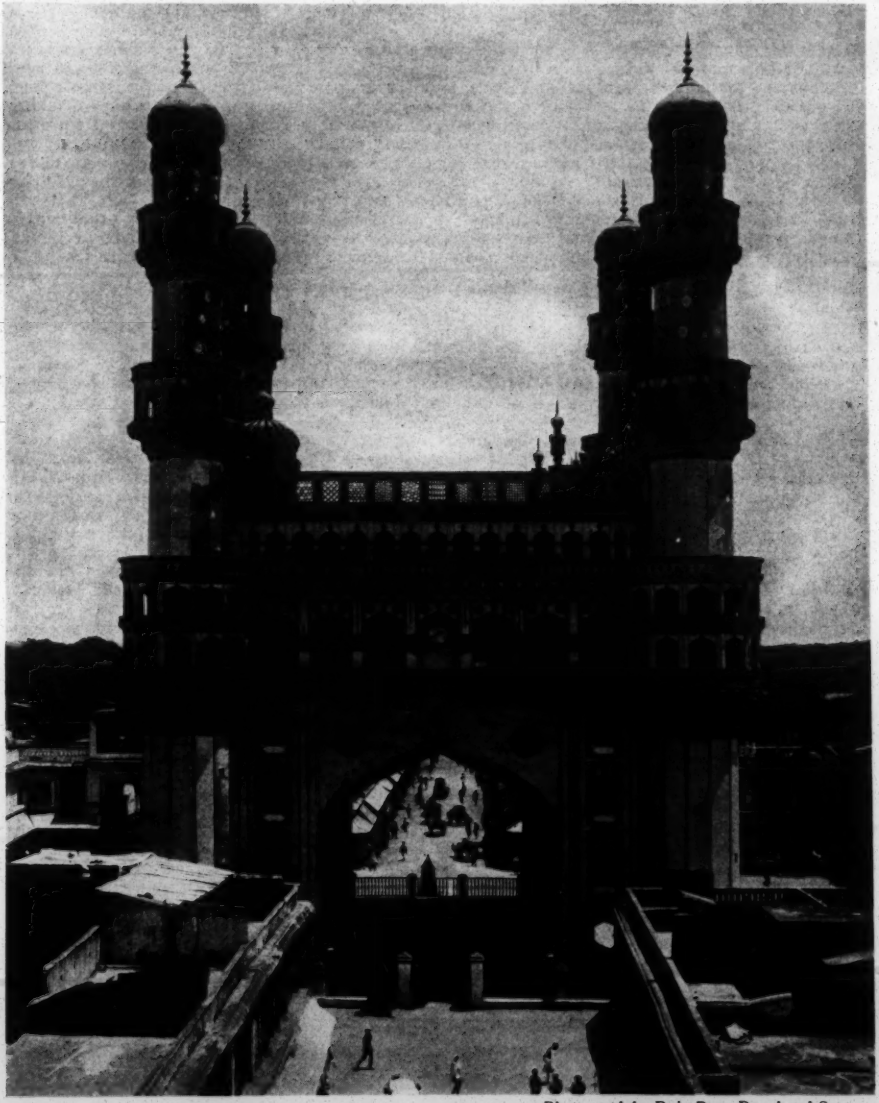
FIERCE-LOOKING MUSK OXEN ARE FRIENDS IN NEED

Although they may charge viciously when cornered or provoked, musk oxen have saved the lives of many Arctic explorers and dogs; hides have served as shelter, and fat as fuel. Now they are being considered as a source of wool for warmth.

towers; the massive teakwood gates topped with sharp iron spikes are hardly less strong. The fortress was obviously built to resist the brute strength of elephants. Only by treachery did Aurangzeb capture it and overthrow the Kingdom of Golconda.

Note: Photographs and references about Hyderabad city and the State of Hyderabad are contained in the following: "Seeing the World from the Air," *National Geographic Magazine*, March, 1928; "Streets and Palaces of Colorful India (color insert)," July, 1926; "The Empire of Romance" (color insert), November, 1921; and "Glimpses of Asia," May, 1921.

Bulletin No. 5, March 2, 1936.



Photograph by Raja Deen Dayal and Sons

GAUDY CENTERPIECE OF INDIA'S CENTRAL STATE

The Char Minar, or "Four Minarets," stands in the middle of Hyderabad city, capital of Hyderabad, India's largest native state. Built in 1591, the Char Minar's arches face the four points of the compass and straddle the streets which quarter this city of almost half a million.